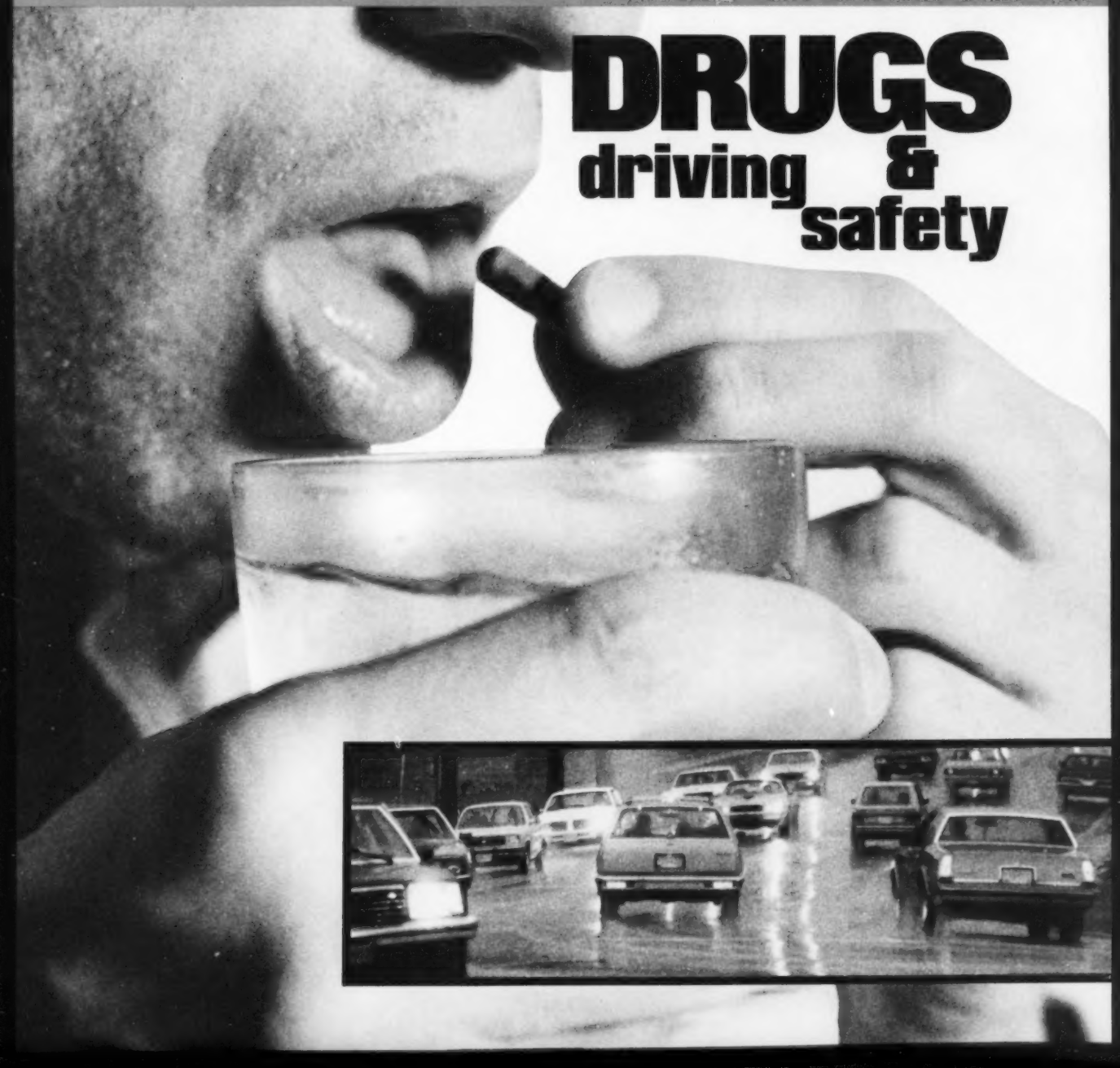
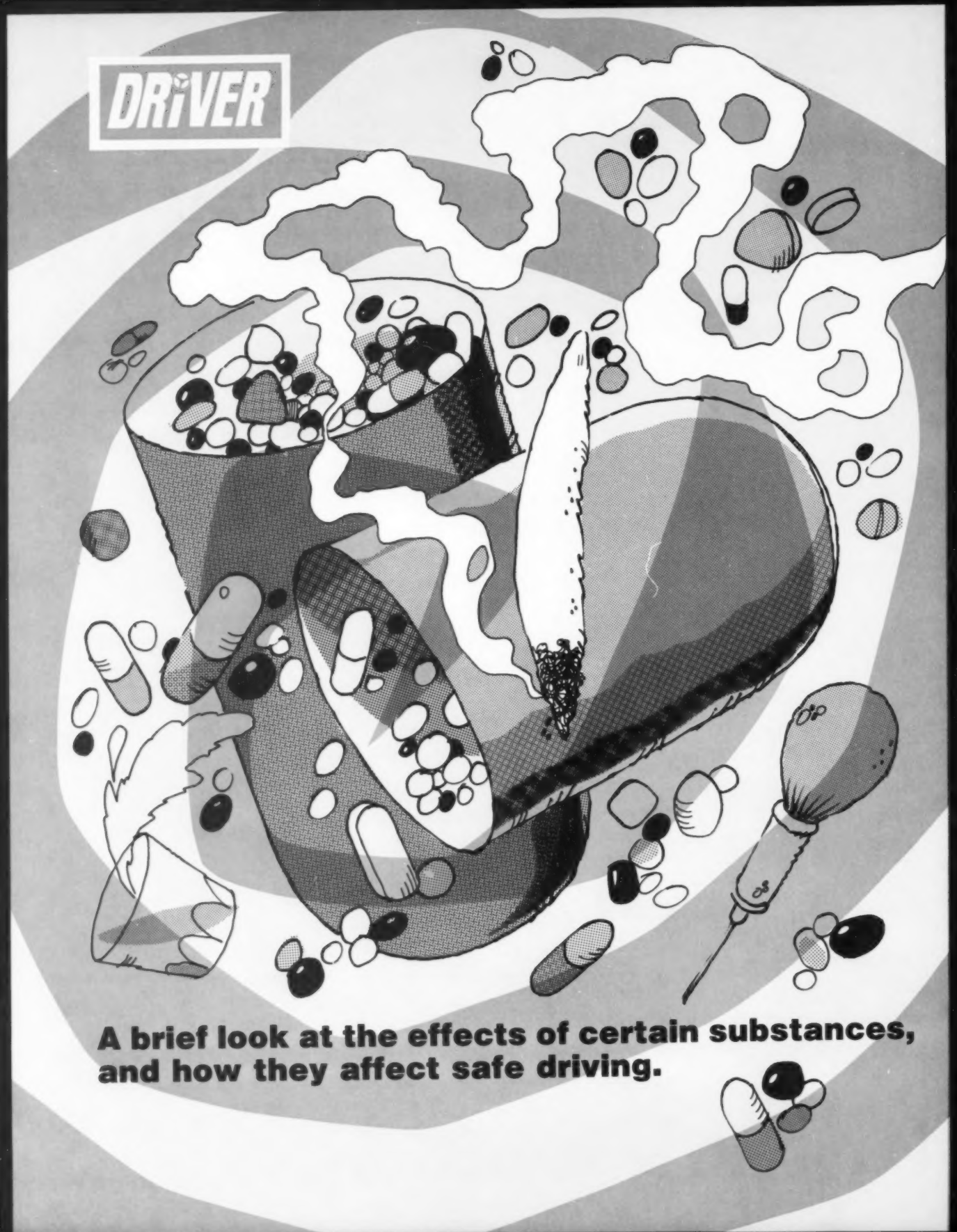
DRIVER

NOVEMBER 1985

SO YOU DON'T WANT TO WEAR YOUR SEAT BELT?



DRUGS driving & safety


DRiVER
A brief look at the effects of certain substances,
and how they affect safe driving.

THE Drug Primer

Here's a flash: Every one of us has climbed into the car after taking a drug.

What makes this surprising is the fact that many people don't realize how many substances are really drugs. For instance, everyone would list heroin, cocaine and Valium under the heading "drugs," but fewer would put alcohol on that list, fewer still would think of coffee as a drug (or containing a drug, really) and almost nobody would think of a drug when they open their favorite brand of cola drink.

Yet many substances we use daily are drugs, or have drugs in them. From aspirin to cigarettes, from coffee to cold remedies, drugs are everywhere.

Therefore, we cannot avoid driving sometimes after having taken a drug. This is not necessarily dangerous — nobody would have difficulty behind the wheel after downing a Pepsi-Cola (unless he was a diabetic, perhaps) — but it all depends on the amount of whatever drug is taken. Virtually *any* drug can be dangerous, or even lethal, if taken in sufficient quantity.

So, at some lower level, most drugs will affect driving ability, and some under special circumstances may even help. We intend to look at some of these drugs in this article. Because of space limitation and the amount of material, this will not be an in-depth discussion, only a summary. Also, we are not concerned here with the lawfulness of any of these drugs, addiction to them or how they are abused, just their effects as they may relate to driving.

With the exception of alcohol, most of the effects of drugs on driving are merely suggested by research. Few actual-driving tests have been performed with most drugs, in contrast to alcohol, which is involved in perhaps half the U.S. traffic deaths every year. However, it is reasonable to assume that the observed effects of drugs would be present behind the wheel just as they are in the lab.

First, a look at some sedatives, or "downers."

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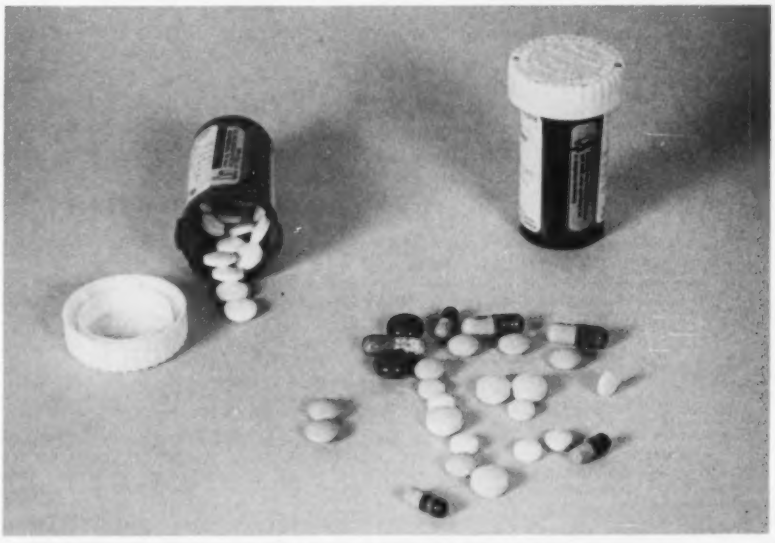

There are thousands of different kinds of drugs and most of them will have some adverse effect on your driving.

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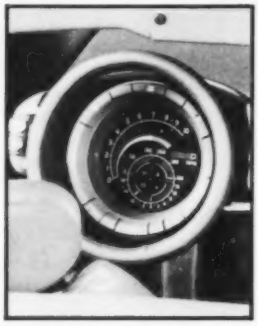

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BARBITURATES

Barbiturates are prescription drugs that are used to treat high blood pressure, epilepsy, anxiety and insomnia. Some examples are phenobarbital, pentobarbital (Nembutal) and secobarbital (Seconal). They are all depressants of the entire central nervous system (CNS), which is extremely sensitive to barbiturates.

In a moderate dose, barbiturates relieve anxiety and tension, and they relax the user's muscles. A larger dose will depress the action of the muscles and heart, slow the breathing, lower the blood pressure, slur the speech, and cause staggering and deep sleep. It also decreases the action of the nerves, causing confusion, a lowered ability to think and concentrate, weakened emotional control, and slowed responses and reactions.

Barbiturate intoxication resembles alcohol intoxication: impaired thinking, lack of emotional control, uncoordinated movement and drowsiness. (The depressant effects of barbiturates are aggravated by combining them with alcohol.) In some individuals and in some circumstances, small doses of barbiturates produce overt excitement instead of sedation.

All of this sounds bad for driving skills. Indeed, laboratory studies have shown that barbiturates decrease control of muscle movements, and that they also affect hand steadiness. Reaction times, both to audible and to visible signals, are slowed under barbiturates. Further, barbiturates decrease hand-eye coordination and the speed with which people process information. Barbiturates interfere with the ability of the eyes to follow moving objects, and with the ability to perform tasks that require a division of attention.

TRANQUILIZERS

Tranquilizers are also CNS depressants, with uses and effects similar to those of barbiturates. They are used to treat anxiety, tension and insomnia, and sometimes to treat pain and as muscle relaxants. A couple of the more common kinds of tranquilizers are chlordiazepoxide (Librium) and diazepam (Valium).

Tranquilizers affect emotional reactions and alertness. The usual dosage will make the user feel relaxed, and will

continued

Mixing different drugs is as dangerous as mixing them with alcohol. Only a doctor can tell you what's safe.

Used as a stimulant, caffeine will work for a while, but it may lead to *less* alertness later, after you stop drinking the coffee or other caffeinated beverage.

Drugs are a dangerous accessory for your car. Your doctor can tell you whether you may drive after consuming any prescribed medication.

lessen anxiety and tension. A higher-than-normal dose will make the user drowsy, and will commonly cause a depression of the central nervous system and relax the muscles. It will also reduce ability to concentrate. A high dose will intensify these effects and create symptoms that resemble alcohol drunkenness.

Tranquilizers decrease the information-processing ability of the brain and also affect hand-eye coordination, both functions necessary for safe driving. With regular use, some tranquilizers can cause impaired driving performance even the morning after use. As with barbiturates, the depressant effects of tranquilizers are also aggravated by alcohol.

If this sounds grim, remember that we give you this information as a caution. If your doctor prescribes medication for you, you may need to drive while using it. But be careful, especially with those medications that cause drowsiness. Your doctor is the final authority on whether or not you may drive.

ALCOHOL

Alcohol is also a depressant of the central nervous system, despite its reputation as a stimulant. The "stimulant" idea results from the fact that alcohol seems to work first on a person's inhibitions and judgment. It reduces the inhibitions and concern over the consequences of one's actions. Therefore, in small quantities, it appears to be stimulant.

A bit more alcohol, and it shows its true nature. It makes the user less alert and slows his reaction times, and then it dulls his senses and interferes with his coordination. More alcohol brings on staggering and loss of consciousness. Alcohol can cause aggressive and hostile behavior. It reduces performance generally and slows reflexes and thinking.

Alcohol has been around so long that it does not receive the same attention in the laboratory that other drugs get. But it is just that — a drug. Ethyl alcohol, in the form of wine, beer, or distilled liquor is the greatest drug problem facing traffic safety experts. It is estimated that alcohol plays a part in half of the traffic deaths each year in the U.S.

So alcohol does not need study in the lab. Simple observation of the highway accident problem shows that alcohol destroys the ability to drive safely.

MARIJUANA

Marijuana is a plant, the cannabis sativa plant. Its leaves are dried and smoked just like tobacco. The psychoactive ingredient in marijuana is delta 9 tetrahydrocannabinol, or THC. THC is a potent intoxicant that is also contained in the resin of the plant, called "hashish."

THC causes a multitude of symptoms, including apathy, dreaminess, drowsiness, excitation and hyperactivity, irritability and restlessness, anxiety, euphoria, depression, hallucinations, panic, talkativeness, impairment of coordination, increased appetite, and distortion of time and space. Obviously, many of these will adversely affect driving ability.

Marijuana impairs visual perceptual

performance enough that it could lead to accidents, according to researchers. The amount of impairment is less than that caused by alcohol, but the stoned driver is not to be preferred over the drunk driver. Neither is safe to be around.

Marijuana also affects the ability to do things that require sustained attention or response to visual and audible signals that appear at random, unexpected intervals. Marijuana interferes with a driver's tracking ability, the process of holding the car in one position in the lane, either by reference to the road, or to traffic ahead. Impairment could be demonstrated up to eight hours after smoking marijuana. Further, it negatively affects peripheral vision.

STIMULANTS

Stimulants have the opposite effect from the depressants — they increase the action of the central nervous system (CNS). Their effects in relation to driving have been studied much less than the depressants. Stimulants include amphetamines cocaine and caffeine.

AMPHETAMINES

Amphetamines are prescribed to treat mental depression and narcolepsy (uncontrollable deep sleep), as well as an aid in weight control. Common amphetamines are Benzedrine, dextroamphetamine (Dexadrine), and methamphetamine.

Amphetamines stimulate the CNS, increase the blood pressure and respiration, curb the appetite, lessen fatigue and raise the user's mood. Heavy doses can bring on muscle spasms, hallucinations, panic and aggressive behavior.

These stimulants can improve performance on a variety of tasks, but there is a danger that users will take more risks, because amphetamines are mood-elevators. Also, the stimulation effect is commonly followed by some depression.

COCAINE

Cocaine is another CNS stimulant. Its chief medical use is as a local anesthetic, used in nose surgery. As an illegally-obtained stimulant, it steps up the heart rate, blood pressure and the body temperature, and it lowers the appetite. It relieves depression, and promotes a feeling of being mentally alert. Unlike the amphetamines, cocaine is a short-acting stimulant, and after the short "high" the user experiences psychological depression, nervousness and irritability.

This is only one reason to keep your car keys far away when you drink. Another good reason is that you can't drive safely.

Cocaine can produce over-confidence in the user about his abilities. Cocaine is unpredictable; small doses have occasionally produced convulsions and death.

CAFFEINE

Caffeine is also a stimulant, one of the most common available. Coffee, tea, and many soft drinks contain caffeine, and a little is even found in cocoa and chocolate.

Concentrated caffeine tablets are sold over-the-counter as stimulants for those who need to stay awake, such as long-distance truck drivers. Caffeine is contained in some headache remedies because it can help relieve headaches by constricting blood vessels in the brain.

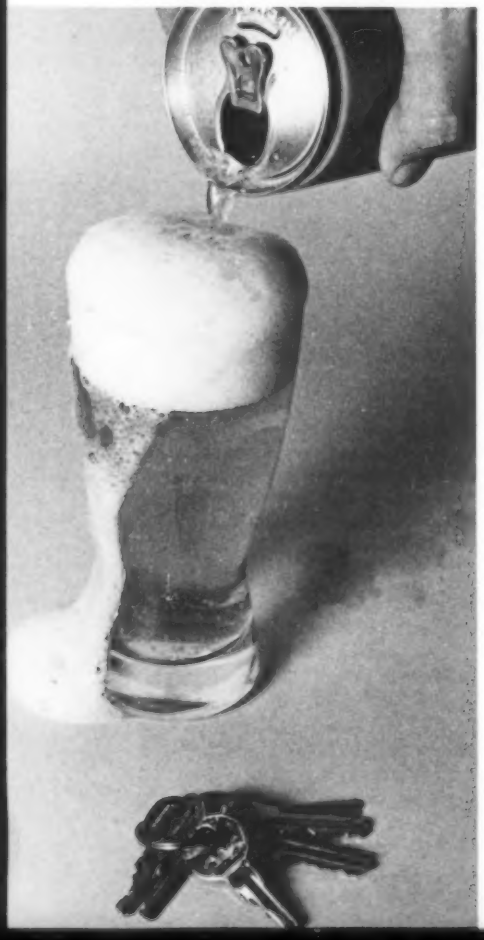
Caffeine stimulates the brain and makes the user mentally quicker and more alert, and also more restless. Thus the effect of 100 to 200 milligrams of caffeine, the amount contained in one to two cups of coffee.

continued

A definition of "stupid" is combining any kind of drug with alcohol. Alcohol will increase the action of most drugs.

A bad combination. Alcohol interferes with coordination and concentration, and it slows thinking, reflexes and reaction times, and these are only some of the reasons it doesn't go with driving.

Marijuana decreases the ability to give sustained attention to a task, and the ability to hold the car in position within the lane.



Ordinary drivers also use caffeine to keep them awake when they are on vacation trips or when they have had too little sleep. If caffeine is used to maintain alertness it should be remembered that once the driver stops drinking coffee he may be in trouble. One of the after-effects of any stimulant use is behavioral and mental depression (meaning less alertness, not "feeling blue"). What this means is that you could get drowsy and even fall asleep at the wheel. It's like the pendulum swinging back in the other direction — the stimulant makes you more alert, but after it wears off you are even less alert.

NARCOTICS

Narcotics are pain-killing drugs that are extremely addictive. Opiate narcotics are those drugs that are derivatives of opium — heroin, morphine and codeine. Heroin has no medical uses today, morphine is used as a pain-killer, and codeine is a cough suppressant. There are also synthetic narcotics such as methadone, which is used to treat heroin addicts for narcotic withdrawal.

Narcotics create a high, euphoric state. The user feels content and detached from the world. A moderately high dose will cause his body to feel warm, and his limbs heavy. His hunger and thirst are reduced along with the sensitivity to pain, and he often drops off into a deep sleep. Users often experience nausea, drowsiness, dizziness, inability to concentrate, and apathy.

Lower doses will cause lowered breathing and heart rates and reduced visual sharpness. Higher doses cause senses to be dulled and the user to lose consciousness.

Studies of driving ability of narcotics users are lacking, but it can be easily seen that these drugs will dangerously undermine that ability.

Alcohol aggravates the depressant effect of narcotics.

HALLUCINOGENS

Hallucinogens, or psychedelic drugs, are most noted for causing hallucinations, but they can also distort the perception of time and space, and reduce the ability to judge between reality and fantasy, and the ability to think logically. Some examples are mescaline, psilocybin, and the intials that are more easily recognized than what they stand for — LSD, PCP, DOM, etc.

Low doses of these drugs, generally, create mood and perceptual changes and higher doses bring on the hallucinations. The effects of these drugs are unpredictable.

Studies are few of driving and psychedelics. One study reports incidents of

"flashbacks," effects of the drugs long after their use. The subjects of the reports stopped their cars or drove off the road to avoid imaginary hazards they believed to be real.

OVER-THE-COUNTER MEDICATIONS

People carelessly down their prescribed medication with little thought of its effects. Small wonder, then, that they take over-the-counter medications with even less caution. The reasoning may go, "Anything available without a prescription can't be hazardous; otherwise they'd control its sale."

However, as we have said, any drug in sufficient dosage can be dangerous, even lethal. It follows that any drug, at some dosage level, can interfere with one's ability to drive safely.

ANTIHISTAMINES

"Do not drive a car or operate machinery while taking this medication, as this preparation may cause drowsiness in some persons." "Since drowsiness may occur, do not drive or operate machinery." These warnings come from bottles for ordinary allergy remedies, which are available over-the-counter in any drug store.

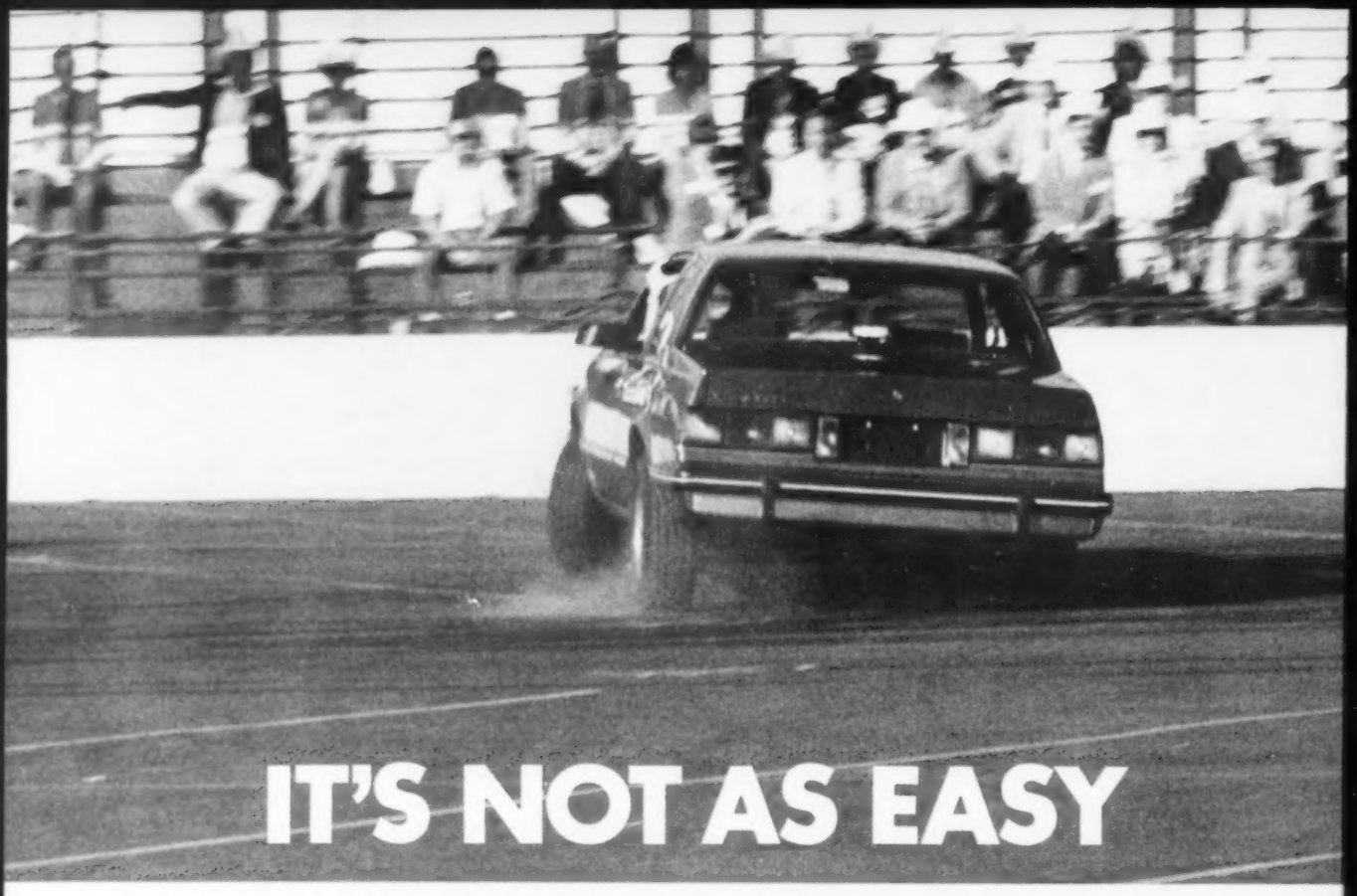
Alergy medications contain antihistamines, which dry up the nose and sinus passages. But one side effect of antihistamines is sedation. Little research exists to show the effects of the antihistamines on driving, but anyone who has taken them can testify to the drowsiness they can cause. Again, mixing these drugs with alcohol increases their effect and is very dangerous.

As we said at the beginning, this is only a short summary of drug effects. Its purpose has been to give you some information to make you think about those effects. Be very careful of any non-prescription medicine you take before driving. Rely on your doctor's judgment in the case of medication he prescribes for you. If you have any questions about the safety of any drug and driving, ask a doctor. Don't assume it's okay.

If you have any doubt about your condition in connection with some drug, stay out of the car.

DOSAGE: Take 2 tablets every 4
hours. Not to exceed 8 tablets in
24 hours. Children (6-12): one-half
above dose. Children under 6: con-
sult physician.
WARNING: Persons with high blood
pressure, heart disease, diabetes,
or thyroid disease, see physician
before using. Since drowsiness may
occur, do not drive or operate ma-
chinery.

Read the label of any over-the-counter medication you take for information on whether it is safe to drive after using the drug. If there's any doubt, check with a doctor.



IT'S NOT AS EASY AS IT APPEARS

It seems like you can't turn the TV on anymore without seeing somebody doing something foolish with an automobile.

It used to be if you wanted to watch flying, spinning, smashing vehicles you tuned in "The Dukes of Hazzard" or "The Fall Guy." Now almost every program that has any adventure to it at all has flying, spinning, smashing vehicles from "Knight Rider" to "Miami Vice" and including "Murder, She Wrote."

Don't get us wrong: We enjoy the excitement of vehicle dynamics as much as anybody, but we do object to these programs making it look so simple that anybody can do it. Not everybody can do it and get it right. And if it isn't done right, somebody or something is *always* going to get hurt.

So, if we may offer this little bit of advice: Leave the stunt driving to the professional drivers like this group from the Joie Chitwood Thrill Show.

(left)
Chitwood stunt drivers never even attempt the simplest stunt without first buckling up.

(top)
While these drivers make this look as easy as bouncing a car over an unseen curb, it actually takes lots of practice to get it right without damaging the vehicle.

(left)
You may not think of following too close as stunt driving, but these drivers will tell you otherwise.

(below)
Leave the jumping to the professionals . . . please.

PREPARATION: *Planning Wins Over The Long Haul*

by MSgt. Lee Adams, USAFR
Travis Air Force Base, California

During more than 30 years in traffic enforcement, I have investigated many fatal accidents caused by lack of proper maintenance, which leads to roadside breakdown.

In many of these cases, the broken down vehicle was struck by approaching traffic as it stood stalled along the roadside.

In other cases, the driver or a member of the party left the stalled vehicle site to seek aid and was struck down by approaching traffic while walking along the roadside or attempting to cross the roadway.

In any case, the driver and sometimes the passengers of the vehicle were struck and injured or killed.

There are some basic rules to follow when your vehicle breaks down and leaves you stranded. In most instances, you should not leave your vehicle. On a freeway, always wait for an officer to arrive to assist you. It is unlawful to walk on a freeway, even if your vehicle is disabled and you are walking to seek assistance.

There are things to do to attract attention to your plight. Seeking assistance from strangers is a calculated risk. Remember the bad guys will stop too. They know you are helpless. Assuming everyone on the highway is law-abiding, you can start your search for assistance by displaying your auto club "HELP" sign. You can hang a handkerchief on the antenna, left door handle, or the outside rearview mirror. You may also place the article out the left door window and roll the glass up to secure it.

Do not stand in the roadway, or even close to it, and wave at passing traffic.

If you must stand outside of your vehicle, always try to keep your vehicle between you and the traffic. When someone does stop, don't stand between the vehicles. There are people who survive such foolishness but usually at the expense of their legs when the rear vehicle is struck from behind by a third vehicle. In most instances the individual is fatally injured.

A way to keep off the shoulder of the freeway is to practice preventive maintenance on your vehicle.

The following items should be checked periodically:

Tires: Tread depth, tread grooves for splits, cracks, tread separation, and overall condition of the tire. Check for proper inflation and load rating. (Include the spare tire.)

Wheels: Check for loose lug nuts. Look for cracks in the wheels, especially near the lug holes.

Shock absorbers: Check for uncontrolled bounce and control of the vehicle. Look at the shocks for damage.

Springs: If your vehicle has suspension springs, are they collapsed, broken, bent, or otherwise in poor condition?

Brakes: Do they work well? Inspect the area behind the wheels for signs of leaking brake fluid. Inspect the master brake cylinder for proper fluid level and leaks. Will your hand brake hold on a hill?

Hoses: Check for cracks and leaks, bulges and any other sign of impending problems with your radiator hoses. Replace hoses every two years.

Belts: Replace belts after two years.

Radiator: Your radiator should have a good grade of antifreeze/coolant at the proper fluid level.

Windshield Wipers: The law requires that you have two serviceable windshield wipers and blades.

Mirrors: Many states require two rearview mirrors on trucks and autos.

Lights: Check all of your lights: stop, turn signals, park, head and tail. Be sure your dimmer indicator works.

Horn: The law requires that you have a horn to use in emergency.

Tune-up: A good tune-up will give your vehicle better mileage and trip reliability. Change the oil and filter periodically.

Trip Kit: Take along a blanket, warm jacket, shoes and warm clothing. Carry a couple of plastic gallon containers of water in the trunk of your car. You should also have a flashlight with good batteries, roadside flares, fire extinguisher, and a tool kit.

Remember, planning is important to a successful trip. Everybody in? Good, got the dog and the cat? We've done our homework so we've eliminated the most likely problems. You can't win them all, but we sure have improved our chances of completing the trip without mechanical problems.

Leg-Saving Hoffman Device

This is not the sort of story you usually see in DRIVER, but we agree with Commander W. C. Liebe, who sent it to us, that the information just might be of great value to some readers at some future time.

by Lieutenant Daniel M. Slack, USNR
Carrier Airborne Early Warning Squardon
One Hundred Twenty Three

A U.S. Navy sailor was riding his Honda 450 Nighthawk motorcycle in the left lane of a four-lane suburban street. A car passed on the right, suddenly cut back in front of him and immediately slowed to make a *right turn* from the *left hand lane*! Unable to avoid the weaving vehicle, the young man crashed into the car's right rear side as it turned into a driveway.

As the motorcycle collided with the car, the cyclist flipped over the handlebars, hit the car with his body and continued over the back of the car onto the pavement. He was transported to a civilian hopsital where he was diagnosed as having severe fractures of both the femur and tibia of his left leg. Due to the severity of the injury, the civilian doctors were considering amputation; however, a command representative decided to consult a nearby naval hospital.

Doctors at the naval hospital elected to insert a steel rod in the femur from hip to knee. In addition, a Hoffman Device was attached to the shattered left tibia. Thirteen hours of surgery and three days later the patient awoke, happy to see his leg still attached but confused about a curious superstructure attached to his lower leg.

The Hoffman Device is a modern version of percutaneous transfixion pin methods developed in the mid 1930's and used to a great extent during World War II for badly fractured bones in the leg. The device uses specially designed threaded rods that are inserted into the bone above and below the point of fracture. After the rods have been threaded into the bone, they are held rigid by an external fixation system made up of ball-joints and wing nuts. This method ensures that bone displacement from weight or stress does not occur. Used instead of skeletal traction or a cast, the Hoffman Device provides much greater support for the broken bone and helps eliminate re-breaking.

The availability of this device at the naval hospital probably saved this young sailor's leg and vastly reduced his recovery time. The Hoffman Device is a relatively new and expensive technology, and may not have been available at the civilian hospital. Many military hospitals, however, are using it with outstanding results. Whatever the case, if you are involved in an accident where serious leg injury is apparent, the Hoffman Device may be the answer to your recovery . . . and it may save your leg.

Don't just JACK IT UP!

An off-duty airman was getting ready to repair the muffler on his 1977 Ford Pinto one day about noon. He had raised the car with a scissors jack placed just behind the right front tire but had not used any blocking or other support. When his wife came home from work in the late afternoon, she found him pinned under the vehicle.

The fire department responded to her call and transported the airman to a hospital where he was found to have died of asphyxiation after the car fell on his chest.

Accidents such as this, where a vehicle is supported only by a jack which slips out, happen too frequently and are needless. If you work on your vehicle at home, be sure you have all the proper tools and equipment. If you don't, use the hobby shop.

So You Don't Want To Wear Your Seat Belt!

by Lt.j.g. Scott Stearney, USN
Meridian, Miss.

Christmas came early last year for three VT-7 flight instructors, Capt. Bob Walters, Lt. Steve Nott, and Lt.j.g. Casey Albert.

The three pilots left an hour and a half early for the 30 minute drive to Bravo Field for field carrier landing practice. The roads to Bravo Field are single lane country roads, winding in places with occasional hills. The drive was pleasant and uneventful for the first 15 minutes. Then the unexpected occurred.

Lieutenant Albert was driving his 1984 Toyota pick-up with Captain Walters in the passenger seat and Lieutenant Nott between the two seats. As they came up over the top of a hill, a large dog jumped in front of the truck. The driver instinctively swerved and hit the brakes to avoid the dog. The truck skidded to the left, rolled end-over-end and came to rest upside down after hitting an embankment.

The three instructors had little time to react to the situation. Captain Walters, sitting in the right passenger seat, instinctively grabbed his legs and bent over with his head between his knees. Lieutenant Albert, the driver, lowered his body sideways over the center console and covered his face. Lieutenant Nott, sitting between and slightly aft of two seats, braced his body against the seats while grasping the undercarriage and ducked his head. The three flight instructors found themselves in a situation which one hears about yet rarely envisions being involved in. The impact was great and very disorienting. They found themselves lying on their backs against the top of the cab with the feet in the air. Although each was stunned, they were still conscious and physically unhurt. Communication between the three was short and direct. After each was sure that the others were unhurt, they got out of the mangled cab of the pick-up truck as quickly as possible.

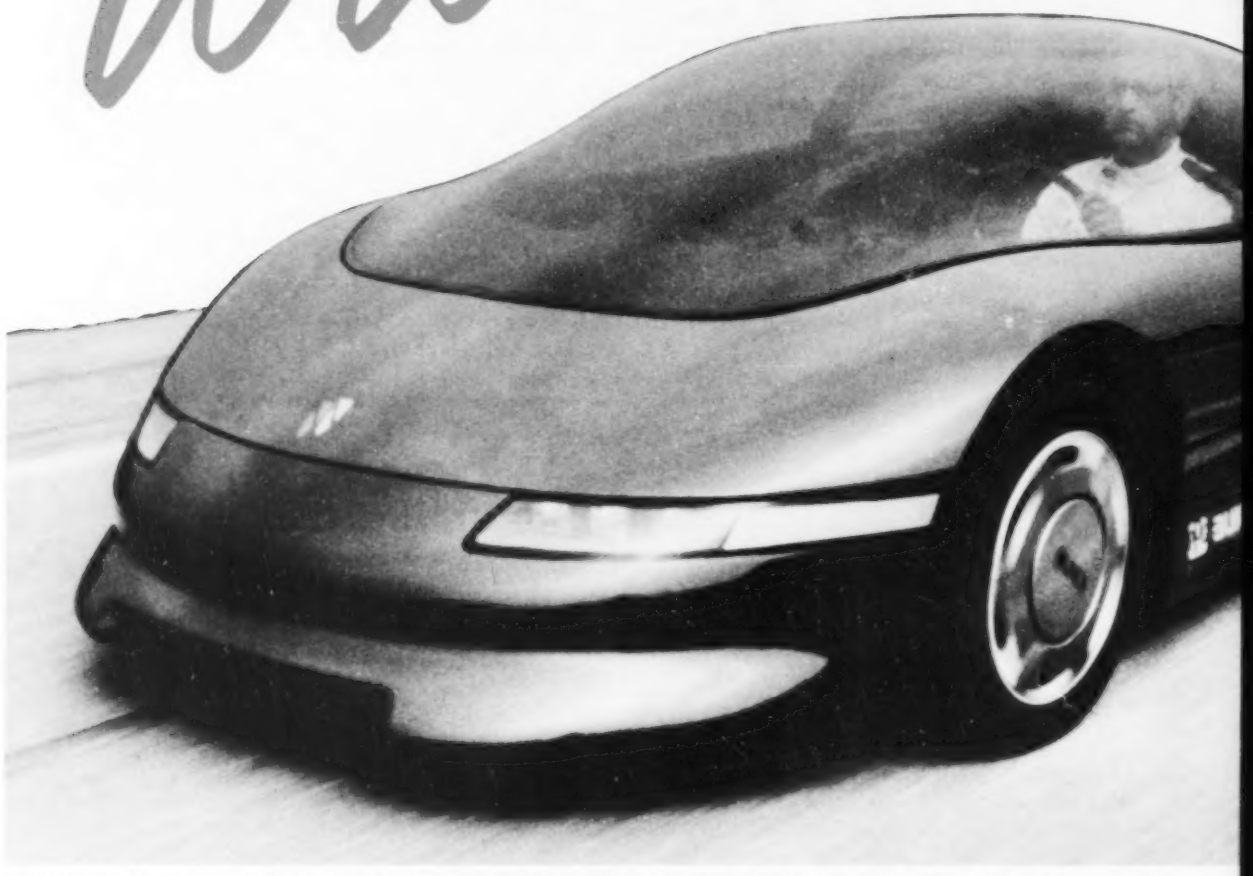
Although the three instructors never made it to Bravo for their overhead, each was lucky to still be alive. This became apparent after looking at the truck. The top of the cab was completely crushed in so the roof line was below the headrest of the passenger seat. Furthermore, the front and rear windshields were shattered as was the right passenger window. Had it not been for the use of seat belts, the aftermath of the accident might not have been so fortunate. If Captain Walters had not had his seat belt on, his head and neck could have been severely damaged by the crushed roof of the cab. His body could have been thrown out the passenger window of the truck and become pinned underneath two tons of metal. Lieutenant Albert could have been thrown through the front windshield and been crushed when the toppling bed of the pick-up hit the embankment. The most miraculous thing about the accident was that Lieutenant Nott, who had no seat belt to wear, was not seriously injured. He was able to wedge himself tightly enough between the two seats to avoid being thrown from the cab and possibly crushed.

There is a lot to learn from this accident, especially since the holidays are just around the corner. First, never be lulled into thinking that driving, even short distances, is always safe. Many different factors can contribute to an accident. When you lose respect for the inherent danger of driving, you lose your edge. Many personnel will be driving long distances these holidays so now is the time to think about seat belts, speed limits, and proper rest periods.

Make sure there is one seat belt for each passenger in a vehicle. Lieutenant Nott said that "divine intervention" was the only reason he was not more seriously injured. Are you going to be as lucky as he?

The potential loss to the Navy in this accident would have been around three million dollars had not all three survived. All three instructors have bright futures ahead of them! Captain Walters and Lieutenant Nott are now flying the F/A-18 Hornet and Lieutenant Albert is flying the A-7 Corsair.

Wildcat:



Wildcat, Buick's new concept car, merges driver and machine eloquently into a glimpse into the safer cars of the 21st century.

The vehicles we drive in the 21st century will probably possess a unique technological merging of driver and machine to make our travel safer, if the new Buick concept car is any example. A one-of-a-kind, driveable, four-wheel-drive, two-passenger concept car, the Buick Wildcat moves dramatically ahead of traditional automotive thinking.

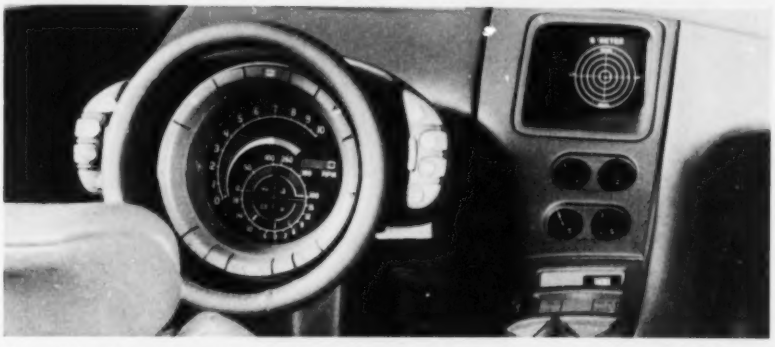
Unlike single-mission vehicles aimed solely at speed, or aerodynamics, or "futuristic" styling, Wildcat is a total integration of design, structure, electronics, powertrain — *and* driver and passenger.

"Wildcat is a new philosophy in concept cars," says Donald E. Hackworth, Buick general manager. "Wildcat is excitement — the excitement of a superb 'Cafe' motorcycle, for example. It's high technology — akin to the design and engineering of world-class racing cars. It's a sense of the classic — recalling the aura of cars like a Type 35 Bugatti. And Wildcat is functional — like the sleek, form-for-function package of a racing catamaran."

Wildcat is a mid-engine car, with the engine mounted longitudinally just ahead

MERGING DRIVER AND MACHINE FOR SAFER TRAVEL

As the canopy is raised, the steering wheel tilts upward for ease of entry. The driver and passenger sit on the low, side sill and swing their legs into the compartment.



Two of the three primary information displays can be seen here: The HUB display in the fixed hub of the steering wheel and the center instrument displaying "G" force.

In the upper left is a head up display (HUD): a 70 percent reflective mirror located 51 inches from the driver's eye. The driver can see vehicle speed, the seasonal or trip odometer and the PRNDL display.

of the rear axle. The V-6 engine has four valves per cylinder and dual overhead camshafts. The 231 cubic inch (3.8 liter) engine develops 230 horsepower and 245 lb. ft. of torque.

"Wildcat's engine components are optimum for the kind of performance we're seeking," says Edward A. Roelle, manager of concept vehicles at Buick. "It offers a total package without sacrificing one aspect in favor of any other.

"For instance, it's not too tough to design a car for flat-out speed, even in the 200 mile-per-hour range. But to get there you'll have to forego a lot of desirable handling characteristics. Or you can rather easily build a serious drag race contender, providing you're happy with fuel economy in the low single digits.

"Our intent with Wildcat," Roelle says, "has been to assemble a package that delivers everything serious driving enthusiasts want, short of an all-out race car."

To enhance Wildcat's performance and driveability, Buick engineers specified a new adaptation of full-time four-wheel-drive.

"When you get in the area of 230

continued

Wildcat continued

The Wildcat is 172.75 inches long on a 102-inch wheelbase with a width of 72.28 inches. It is 43.7 inches tall and weighs 2,910 pounds.

horsepower, with the kind of torque Wildcat generates, four-wheel drive provides substantially more traction and road handling than is possible with either front- or rear-drive," Roelle explains. "With a chain-drive transfer case and a torque divider, 66 percent of the power is delivered to Wildcat's rear wheels, 34 percent to the front."

Wildcat is equipped with an Anti-lock Braking System (ABS), a computer-controlled system which senses wheel speed and traction, allowing controlled braking by preventing wheel lock-up during sudden stops or when braking on low-coefficient road surfaces. Wildcat is equipped with four-wheel power disc brakes.

Wildcat's transmission is a modified General Motors' THM700 four-speed automatic. Extensive mechanical and electronic advancements have been incorporated to elevate Wildcat's performance.

For precise gear control, the transmission has a clutchless manual shift. "The performance enthusiast knows which gear Wildcat should be in — this kind of driver is always a better judge than is any automatic gear selector," Roelle says.

Transmission electronics come into play as "fail-safe" protection. The onboard computer prevents downshifting at excessive engine revolutions. When Wildcat is stopped, the transmission returns automatically to first gear.

The Wildcat fuel system is a foam-filled 15-gallon fuel cell mounted between the passenger seat back and the engine. The exhaust system includes stainless steel headers.

A major portion of the total Wildcat driver/machine integration is the dramatic design and styling of the car, under the supervision of Charles M. Jordan, director of design, GM Design Staff.

"Wildcat's strong and purposeful form could well be an inspiration for a whole new direction in automotive design," Jordan says.

"One of the major design achievements is the smooth profile of the canopy and body. Of course, the exposed engine is a dramatic departure from standard designs. Inside, we put instrumentation where it can be easily seen and controls where they can be easily reached, all in a totally integrated compartment," Jordan explains.

The structure of Wildcat is composite carbon fiber and glass. Front and rear steel crossmembers are bolted to the underbody. The engine projects from the rear engine compartment as an integral part of the Wildcat design.

Access to the driver and passenger compartment is via a raised canopy made of cast grey acrylic and carbon fiber with glass reinforced polyester resin. Solenoid-actuated exterior latches, located in the left rocker panel, unlock the canopy. As the canopy is raised, the steering wheel tilts upward for ease of entry.

The driver's seat is power adjustable and features inflatable lumbar and side supports.

Inside, new applications of Buick's advanced automotive electronics provide the driver with more information than any other driveable vehicle in the industry.

Primary electronic instrumentation — tachometer, oil pressure, battery, fuel, and coolant temperature — are displayed in the center of the stationary steering wheel hub.

Speed and gear selection are projected on a "heads-up" panel immediately in front of the driver's line of sight. The panel is transparent, and the readouts translucent, to maximize "eyes on the road" driving.

A vacuum-fluorescent dot matrix display on the center console provides an even broader range of information — some unique in the industry.

For example, one display indicates the front, rear, and side "G" forces experienced in a turn. Other displays show instantaneous horsepower and torque, and the maximums available at the given rpm; a "three-dimensional map" of the spark function for precise engine tuning; percent of tire slippage, if any, at each wheel; low-pressure warnings for all four tires; electronic compass; and oil temperature gauge.

"In all," Roelle says, "Wildcat provides every bit of instant information needed by even the most performance-conscious driver. The information is logically arrayed to put the most frequently used data closest to the driver's normal view."

Controls also are logically arrayed. Immediately left of the steering column are all light controls: headlamp on-off and dimmer, interior light intensity, and emergency flashers. On a similar pod to the right of the steering column are controls for windshield wiper and washer and a control to adjust the position of the rear-mounted spoiler.

Four pairs of switches surround the fixed steering hub within the circumference of the steering wheel: ignition start and stop, turn signals, horn, and trip odometer/metric conversion.

The center console contains controls for heater, ventilation, and air conditioning, mechanical back-up ignition switch, power seat controls, and the transmission range selector.

"Our foremost priority in developing Wildcat," Roelle points out, "has been to provide an automobile for the driver who enjoys driving . . . not just as a means of getting from Point A to Point B, but as an exercise combining a high degree of individual control with an extraordinarily high level of design and engineering excellence. That combination is seldom seen in competitive production cars or concept cars."

As with all give away programs, the "Helmets Work!" offer advertised in the February 1985 DRIVER is winding down as it runs out of T-shirts.

But don't fret. If you can answer "yes" to the following questions you may be one of the special people eligible to join the Saved By The Helmet Club.

1. Are you a motor sport enthusiast?
2. Do you usually wear a helmet when you ride?
3. Have you ever been involved in an accident?
4. If so, were you wearing a helmet when the accident occurred?
5. Do you feel that wearing your helmet helped you survive the accident?

The Saved By The Helmet Club is a national organization created in 1974 by the Safety Helmet Council of America (SHCA). Its members are a special group of people with something very important in common: They survived a motor sporting accident.

The story they ask you to relate on a questionnaire is certainly not a pleasant one. But the information you provide them will be utilized in the most beneficial way possible . . . that is, to help them help members of the SHCA make the most safety efficient helmets they can.

The Saved By The Helmet Club does not promote mandatory helmet laws. But through the experiences of club members, it helps bring visibility to the need for all motor sport enthusiasts to wear quality helmets every time they ride. Your input will be used to promote and encourage research in helmet design and effectiveness.

If you'll contact the club they will send you a questionnaire. Once they get the completed questionnaire back, they will send you an embroidered patch and a certificate (suitable for framing) as a Charter member of the Saved By The Helmet Club. There is no cost for this membership — just your time to complete the questionnaire. You also will be receiving a quarterly newsletter, through which ideas and experience are shared with all members.

The address to write to is:
SAVED BY THE HELMET CLUB
P.O. Box 92597
Los Angeles, CA 90009

Are you one of the special people?

NHTSA REASSURES PUBLIC ON SAFETY OF CHILD SEATS

The National Highway Traffic Safety Administration (NHTSA) has assured concerned parents about the reliability of certain child safety seats used in automobiles.

"We are distressed by a news story that circulated recently (Knight-Ridder News Service, July 17) giving the incorrect impression that certain child car seats that are marked as meeting NHTSA standards may be unsafe," said NHTSA Administrator Diane K. Steed. "We also are concerned that some owners, alarmed by these misleading reports, are returning the seats to the stores where they were purchased."

MARYLAND PROVISIONAL LICENSE

A state of Maryland demonstration program for 16 and 17-year-old beginning drivers shows that provisional licensing can reduce traffic violations and lower the risk of accidents for these age groups, the National Highway Traffic Safety Administration (NHTSA) reports.

Maryland started its provisional licensing demonstration program in 1979. During the four-year period of monitoring the drivers, there was a 10 percent decrease in traffic convictions and a five percent decrease in daytime accidents for these first-time drivers.

In the Maryland program, applicants for driver licenses who are under 18 received a six-month provisional license, which prohibited them from operating a motor vehicle between 1 a.m. and 6 a.m. unless accompanied by an adult. A six-month violation-free driver record and completion of a driver education course were required to obtain a regular license after the six-month provisional period ended.

In addition, beginning drivers convicted of a traffic violation were required to take part in a driving improvement program.

As a result of the successful demonstration project, Maryland recently made the provisional licensing requirements permanent and made them even stricter. New drivers under age 18 now receive a one-year provisional license and must be violation-free for one year before obtaining a regular license. The nighttime restriction period has been extended and now starts at midnight rather than 1 a.m.

ABOUT THAT LITTLE HOLE IN YOUR WINDSHIELD

You've been running late all morning and nothing seems to be going your way. Your whole routine is a shambles. Finally, you're out the front door as a cold, damp blast of air causes a shiver to run down your spine. You run to your car. What's this? You remember the weather man said it would freeze last night but he didn't say a thing about rain. Now you're really behind the power curve. Clearing that windshield is not going to be easy. Ah! That's a good idea. If you quickly scrape a hole through the ice, you can at least get started to work and the defroster will take care of the remaining ice. Right? Wrong!

We've all done it sometime in our driving career. It may not have been ice. It may have been fog on the inside glass, snow, or maybe a dirty windshield. The fact is, anything on your windshield that obstructs your vision is potentially very dangerous. Consider that 12 square feet of forward viewing area is reduced to less than one-half square foot when you clear only a small hole. The only way to solve this is to take the time to do things right and plan for the unexpected.

Prepare yourself and your car for the coming winter. Pay particular attention to windshield wipers and wiper fluid. Check that your anti-freeze is in accordance with the manufacturer's recommendations for your area's expected weather.

And next time you're on your way to work and there has been a good freeze, take time to completely clear your windshield. That means that large clump of snow on top, too. It will surely come tumbling down as soon as you brake. Watch out for those people peeping through their little hole in the windshield. You may see them, but they may not see you! (Submitted by Lt. Gary Atkinson, USN)

LOWER TEMPERATURES CAUSE LOWER TIRE PRESSURE

Tire pressure should be checked when the weather turns cooler in the fall and winter, advises the American Automobile Association. A car's tire pressure decreases as the temperature drops — about one pound per square inch for each 10 degree Farenheit drop in temperature. A tire correctly inflated at 70 degrees could be as much as five pounds under-inflated at 20 degrees.

Tires should be checked often and only when they are "cold," preferably before the car is driven in the morning or driven less than one mile. Tires expand once they heat up, making the air pressure reading inaccurate.

A common misconception is that lower tire pressure improves traction in the snow. Under-inflated tires cause more tread than necessary to come into contact with the road, affecting vehicle control and creating excessive drag which wastes gasoline and wears out the tires.

Mud and snow tires, marked "M/S" on the tire sidewalls, require four more pounds of pressure than regular tires. Extra tire pressure increases snow tire treadlife and improves vehicle handling on paved roads, AAA said. Extra pressure added to snow tires must not exceed the tire's maximum rated pressure as noted on the tire's sidewall and listed in the owner's manual.

Motorists should take the following measures to prepare their tires for colder weather driving:

- Check tread depth: conventional tires require a minimum of 2/32-inch, mud and snow tires need 5/32-inch;

timely

- Avoid mixing radial and non-radial tires;
- Snow tires can be used on all four wheels of rear-wheel drive cars to maintain a front-rear traction balance;
- Snow tires should be mounted on front wheels of front-wheel drive cars;
- Check tire pressure of spare tire regularly;
- Buy and use a good quality tire pressure gauge;
- Never inflate a tire beyond the stated maximum load level molded on the tire sidewall;
- Tires should be rotated according to the pattern and frequency outlined in the owner's manual.
- Extended highway driving wears out snow tires quickly; remove them when winter is over.

FRONT WHEEL DRIVE

Front-wheel drive provides the car owner with many advantages says the Automotive Information Council. The main advantage of front-wheel drive is that it has most of the mechanical parts up in the nose of the car, leaving most of the car's volume free to accommodate passengers and luggage. Front-wheel drive can offer better directional stability, which makes it easier to drive on rough roads and in strong winds. At proper highway speeds, it can provide better traction than rear-wheel drive vehicles on slick surfaces when the surface of the road remains basically level.

The most notable difference between driving a front-wheel drive vehicle and rear-wheel drive comes during emergency braking on low traction surfaces such as rain, ice or snow. The old rule about pumping your brakes on slippery surfaces has a good basis if you are in a rear-wheel drive car. Pumping the brakes under the same circumstances in a front-wheel drive car would be undesirable, since it only guarantees periods of reduced steering control, when the front tires and transmission remain "inertia-braked" from the lock-up, and increases the possibility of the car spinning out.

To avoid this problem in a front-wheel drive car, use the newer squeeze technique when braking on slick surfaces. Squeeze your brakes with a slow, steady pressure until just before they lock. When you feel them start to lock, ease off until your wheels are rolling easily, then squeeze again. Slamming on the brakes locks the wheels and will probably cause you to spin out. Even if you don't spin, locking your wheels reduces the traction you need to control steering. This new squeeze technique works well with both rear-wheel drive and front-wheel drive.

If you start to skid on a front-wheel drive car, observe the "off" rule. Take your foot off the accelerator and off the brakes. Try to keep the front of the car pointed in the direction you want to go. Hold the steering wheel firmly and don't make large turns to correct the skid.

LEADED GAS PHASEDOWN

Many old-car owners, whose vehicles normally run on leaded gasoline, are confused with the Environmental Protection Agency's leaded-gasoline phasedown ruling. They wonder if using unleaded (or low-lead) gasoline will harm their cars' engines.

Their concern stems from an EPA ruling which reduced allowable lead content from 1.1 grams per gallon to .50 gpg as of July 1, 1985. The agency further mandated that lead content be reduced to .10 gpg by January 1, 1986 — with a possible total ban on leaded gasoline as early as 1988. These rules took effect because studies indicated lead in gasoline is harmful to the environment and to human health.

Nonetheless, many old-car owners question whether or not they can safely use unleaded gasoline in their cars designed for leaded fuel. According to Bill Simmons, a syndicated auto writer, engines that require leaded gasoline (because the lead acts as a valve guide lubricant) will run normally with a new fuel blend in which chemicals replace the lead.

"The major drawback of the new fuel is that it will be priced higher than unleaded premiums," said Simmons. "The number of cars in this situation is relatively low — primarily those built before 1972."

Simmons added that some cars built between 1972 and 1979 (which were able to pass emissions tests on either leaded or unleaded gasoline) will operate normally on unleaded regular gasoline.

Other car-care experts agree that leaded-gas auto owners should have few problems using unleaded gasoline if they follow a few simple steps:

First, if knocking and pinging occur when using unleaded gasoline, a blend of higher-octane premium unleaded and regular unleaded should lessen the problem. William J. Knight, GM public relations representative, suggests a 25 percent premium to 75 percent regular unleaded mix for minor knocking, increasing the premium percentage if the knocking is excessive.

Second, it is important to avoid excessively high speeds and high engine-stress situations. This is because almost every car made before 1979 uses the lead in gasoline to lubricate engine exhaust valves. Driving at moderate speeds should present few, if any, problems.

Finally, if consumers have any further questions about using unleaded gasoline, they should read their owner's manual or contact the car manufacturer.

Although the American public is barely aware of the lead phasedown, a few groups are vocally opposed to the new EPA rules. One such group is the antique-car buffs. They argue that using unleaded gasoline could damage their cars' engines. EPA claims that the .10 gpg lead level is adequate to lubricate all valves.

It is unlikely that the EPA will reverse its decision. In fact, a recent EPA report shows that lead levels in the air dropped two-thirds between 1975 and 1983.

topics

TRUE ACCIDENTS

Following are a few reports of accidents involving Air Force members. We have removed names and references to dates and places.

CATCH-UP

Three airmen worked from 1600 to 2400 hours and then went to a store to get some beer. They went back to the base dormitory to drink it. Later they went to a local park for a couple of hours before returning to the base. One of the airmen offered to let another sleep at his off-base house because he wouldn't get much sleep in the daytime. He agreed and said he would take the third airman home on the way. They left in two cars at about 0450 hours. Once outside the base they went south at high speed. The airman traveling alone passed the airman with the passenger. The latter, attempting to catch up, lost control of his car on a curve. The car rolled for about 100 feet, broke a tree six inches in diameter and came to rest against a larger tree. Both airmen were thrown from the car. The passenger received minor injuries and the driver was pinned under the car. He was taken to the hospital where he died four days later. His Blood Alcohol Level was .127, his passenger registered .035 and the other driver was .056. None of the airmen had worn seat belts.

VICTIMS

Three people were riding in one small pickup truck going north on a highway at night. An airman first class was sitting in the middle position where no seat belt was installed, his wife was driving, and another airman — who had not fastened the seat belt available to him — was sitting on the right. About 2000 hours, a van driving in the opposite direction entered the 40-foot-wide median. It ran through bushes and grass for about 340 feet before coming out in the left lane of the northbound side of the highway. The van and the pickup collided head-on. After this crash, a car that had been following hit the pickup in the rear. The airman first class suffered a concussion and cuts. The airman in the right passenger position was dead on arrival at the hospital. The woman in the following car was wearing her seat belt; she was treated at the hospital and released. The van driver, who had crossed the median, tested out with a Blood Alcohol Content of .201, twice the legal level of intoxication.

FATIGUE

A master sergeant was driving his car south toward his overseas base at night. He was returning from a diving expedition, and he was fatigued. His car collided with the rear of a gravel truck that was parked partially in the roadway. After that, the car veered across the northbound lane and hit the concrete pillar of a bus stop shelter. Police found him lying outside the car. He died in the hospital of head and chest injuries.

FELL ASLEEP

An airman was driving west on a highway, going toward his base after a visit to his father. At 0430 hours he had been on the road for eight hours and he was only 30 miles from his destination. He apparently fell asleep at the wheel and the car went onto the shoulder, traveling about 450 feet. He came back onto the road, skidded 60 feet in the westbound lane, then traveled 105 feet in the center median and entered the eastbound lane, still skidding toward the west. The car was then hit by an eastbound semi and pushed back 290 feet. When they stopped, the semi's right front wheel was resting on the passenger side of the airman's car. He died two days later from massive head injuries.

S-CURVE

An airman was driving his motorcycle north toward his dormitory after work, wearing a full-face helmet. He had had only 3½ hours of sleep in the previous 36 hours. He entered an S-curve at about 35 mph. He negotiated the first part of the curve, but delayed his turn or failed to lean far enough for the second. The motorcycle drifted to the right and the front wheel and the foot peg hit the curb. The airman hit the brakes just before it hit the curb, but they had little or no effect. The cycle bounced along the curb for a distance and the airman was thrown off about 10-15 feet from a utility pole. He hit the ground, rolled once and then struck the pole facing forward in an upright position at between 10 and 15 mph. He suffered severe internal injuries and died six days later. Investigators concluded his fatigued condition caused him to incorrectly negotiate the curve.

PASSING ACCIDENT

Two airmen were in a car traveling eastbound toward their base in the evening. At about 1815 hours they attempted to pass another vehicle on the highway. The driver lost control of the car and it entered the median, where it traveled about 180 feet and then started overturning. Both the driver and the passenger were thrown out of the car. The driver received minor injuries and was treated and released. The passenger was pinned under the car and suffered a broken back and spinal cord damage, which paralyzed him from the neck down. He died nearly three weeks later. The two had been drinking, and the driver had a Blood Alcohol Level of .119.

STUDENT DRIVER

An airman was driving west on a two-lane road. Traveling eastbound was a car driven by a student driver. The student driver allowed his right front tire to drop off the road onto the shoulder. He overcorrected to the left in his attempt to get back onto the pavement and went across the road into the path of the airman's car. The cars collided and both went off the road into a ditch. The airman was killed.

DRUNK

A technical sergeant was driving at high speed on a road at about 1855 hours. Another driver saw him pass at between 80 and 90 mph. He negotiated one curve in the road and then slid to the right shoulder on the next curve. He overcorrected to the left and skidded off the left side of the road about 500 feet beyond the curve. The car ran up the bank of the ditch and hit a large tree three feet from its base. This impact tore the entire front subframe off the car and also ripped the engine loose. The engine was later found 50 feet away. The car flew through the air for a distance, shearing off tree tops at about the 10-foot height, and then hit the base of a large tree. The technical sergeant, not wearing his seat belt, was thrown out of the car and he died from massive injuries, including head injuries. His Blood Alcohol Content tested out at .18.

(left)
Sergeant Flowers instructs a rider how to run through part of the motorcycle test.

(below)
An evaluator checks the MOST chart to see if a cyclist stopped in the proper distance.

(bottom)
Sgt. Michael R. Flowers, 475th Air Base Wing Safety Office, evaluates a rider who is negotiating a turn as fast and safely as possible.

YOKOTA has MOST II

U.S. Air Force photos by TSgt. Eric Jensen

For the last few months, Yokota Air Base's motorcycle riders have had their riding skills evaluated where it counted most — MOST II that is, the Motorcycle Operators Skill Test, phase II.

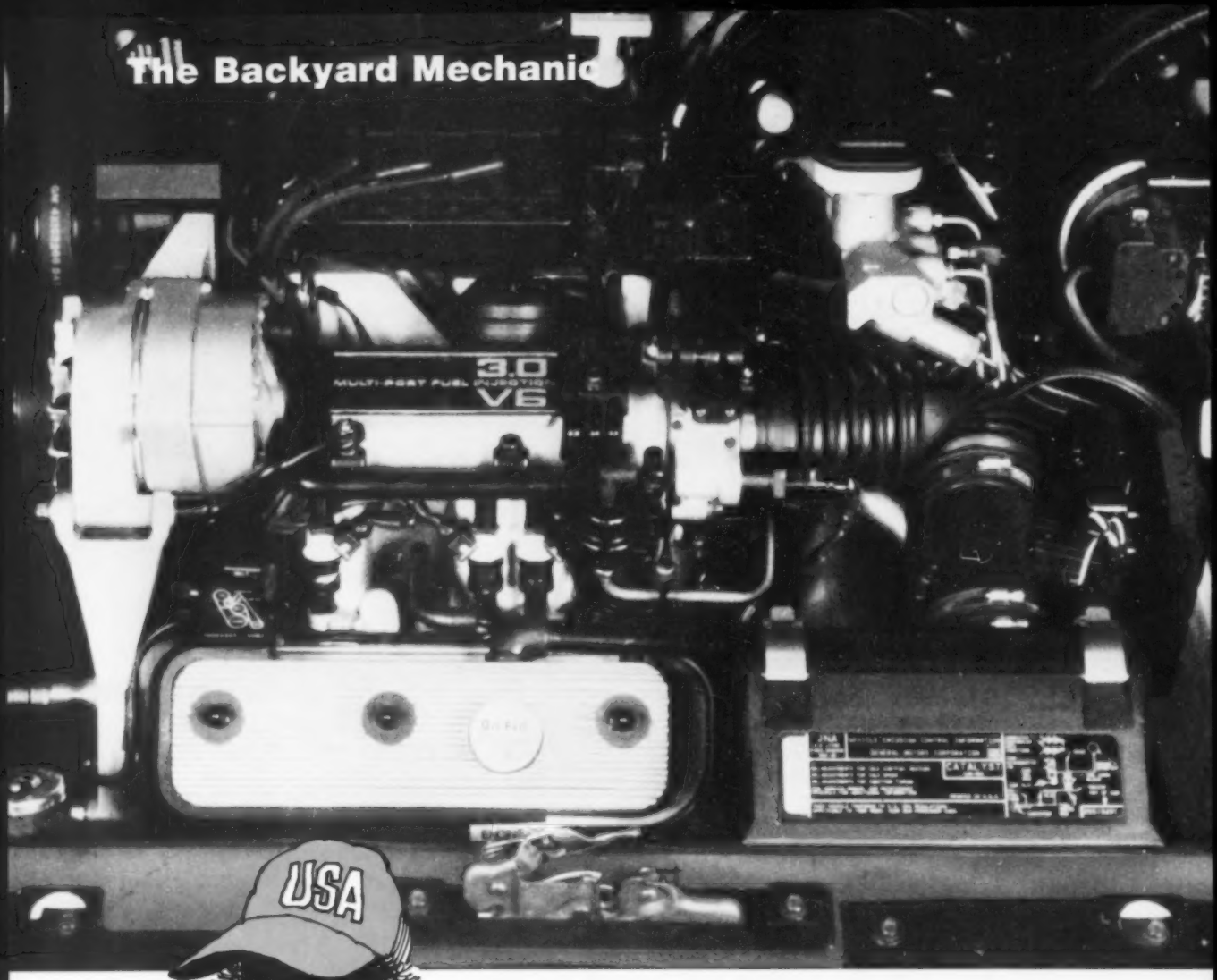
While this method of testing a rider's capabilities is mandatory at Air Training Command and Military Airlift Command, among others, this is a test program at Yokota, according to Sgt. Michael R. Flowers, wing safety technician and administrator of MOST II at Yokota.

Some riders fear that MOST II will mean attendance at yet another set of classroom sittings, but as Sergeant Flowers put it, "Those who have gone through the Better Biking Program or the Motorcycle Riders Course and pass MOST II evaluation will be given their licenses without classroom work." He added that those who do not pass MOST II must attend classroom training, which may last from one to three days.

Is MOST II effective? Sergeant Flowers, a long-time motorcycle rider, thinks so . . . "At Kirtland AFB, N.M., we evaluated 830 people and failed a good number of 20 and 30-year riders and had to retrain them. As the program went along we saw a decrease in motorcycle accidents."

He added that the decrease in accidents was not attributed to MOST II, but to identifying riders who needed training. Giving them that training improved the statistics.

MOST II equipment consists of a track painted on asphalt, two electric eyes and a brain to calculate the speed of the rider to control part of the lighting system. It is used to test the motorcycle rider's bike handling ability.



THE BASICS HAVEN'T CHANGED

(left)
One look under the hood is enough to make most people decide they don't want to be Backyard Mechanics.

People are always saying that the days of the Backyard Mechanic are numbered. They cite facts about engines being non-adjustable and the increased use of computers as examples of why the average Jody soon won't be able to work on his or her own car.

However, the true Backyard Mechanic is finding that for the previously stated reasons, s/he has to do what work s/he can in order to keep the costs of owning a vehicle down. Few people can afford to pay a shop $35- to $45-an-hour plus parts plus materials plus fluids plus tax to do work that is easily performed in the course of an afternoon in their own driveway, garage or installation hobby shop.

As for computers and other little boxes with fancy names, once you realize how simple these devices really are, you'll know that you *have* to be smarter than they are. And even though vehicles are being loaded with more and more little boxes and on-board computers, the basics haven't changed.

A computer is an electronic device that processes data. It is capable of receiving input and output. A computer possesses such characteristics as high speed, accuracy, and the ability to store a set of instructions for solving a problem.

Computers are simple because all they can recognize are positive (+) and negative (−), or on and off. This is accomplished by pulsing electricity. The two symbols that represent these states are 1 and 0. This is a binary system.

For example, using the American Standard Code for Information Interchange (ASCII) with seven-bit, eight-channel code (each character is read down in this example):

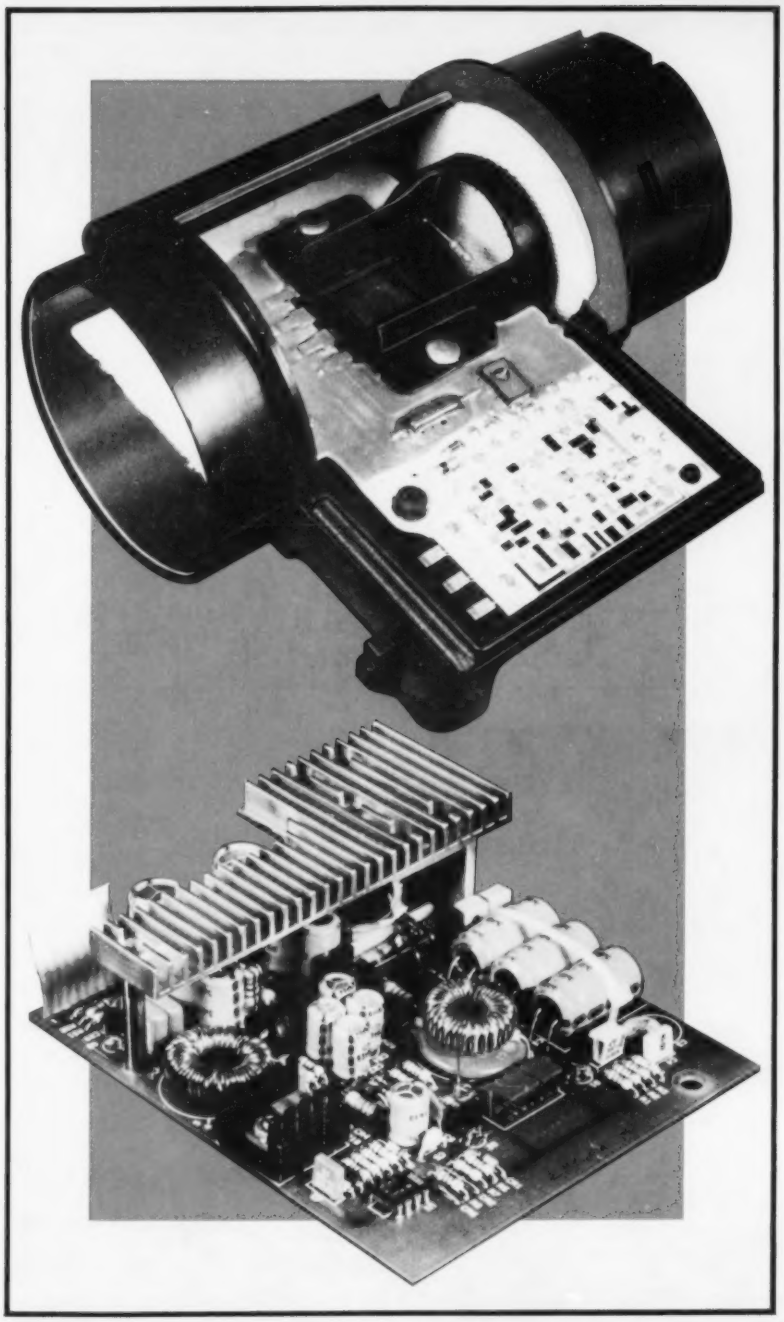
01111000 11101011
10110110 00100101
00000001 11000100

00011000 10010110
00001010 00000000
00000000 00000000
11111111 11111111
00100010 01100011

is:

BACKYARD MECHANIC.

The advantage the computer has is that all these ons and offs can be pulsed a million or more times a second.



(top)
The insides of a mass air flow sensor tell you you're not about to be making any adjustments in your garage.

(above)
To run properly, computers need a steady power supply — another item most Backyard Mechanics aren't likely to fix.

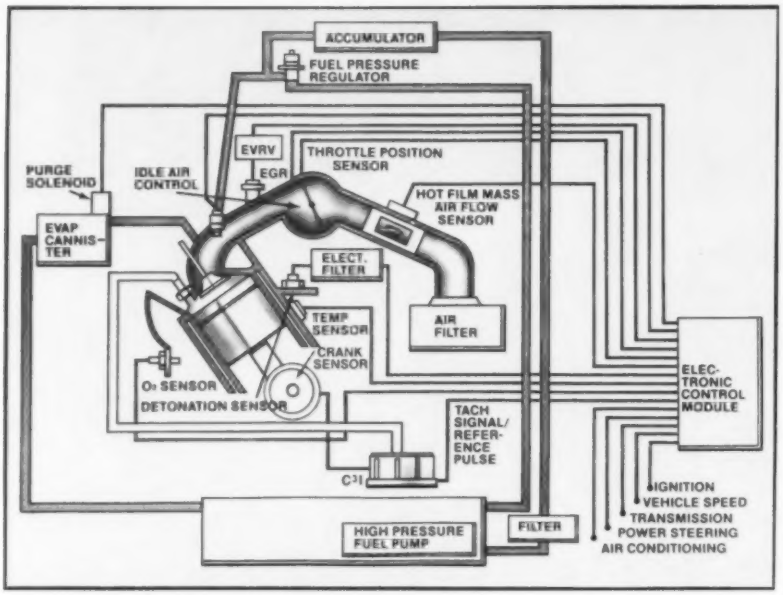
But enough on how simply computers work; your concern as a Backyard Mechanic comes when it doesn't work.

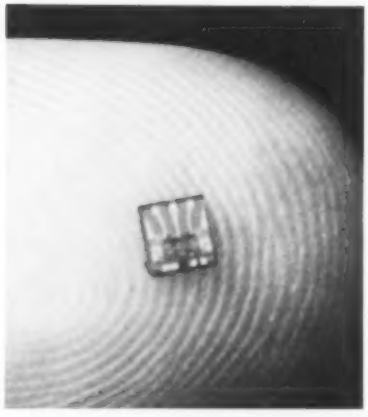
Listed here are items that are currently being sensed by domestic cars and those items that are being controlled. Of course, not all these sensors and controls are being used on all vehicles. On the other hand, certainly more will be added in the near future.

All of these sensors, switches and electrical signals provide data to on-board computers. The computers use this infor-

continued

continued





(above)
Computers sense and control any number of engine functions.

(left)
The heart of a computer system is silicon chips like this one.

(below)
If you have an electrical problem, start with the basics such as fuses. The fuse panel on the new cars such as the Ford Taurus and Mercury Sable are easy to get to.

mation to make decisions and then issue command signals to actuators (control units or solenoids). This is usually done in order to accomplish the goals of maximum engine performance, fuel economy and reduced exhaust emissions.

CONDITIONS MONITORED

- A/C On/Off
- Air Flow — Mass, flow, temp
- Barometric Pressure
- Brake On/Off
- Coolant Temperature
- Crankshaft Position
- Cruise Control On/Off
- Detonation/Knock
- Engine Speed
- EGR Flow/Vacuum
- Exhaust Gas Oxygen
- Manifold Pressure
- Park/Neutral Switch
- System Voltage
- Throttle Position
- Transmission Gear Position
- Vehicle Speed

ITEMS CONTROLLED

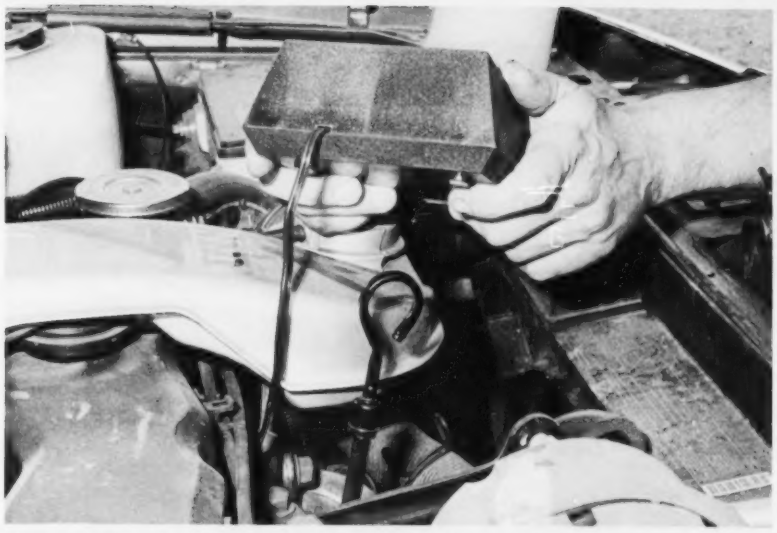
- Air Conditioning
- Air Divert Valves
- Air/Fuel Ratio
- Canister Purge
- Cooling Fan Motor
- EGR Solenoid
- Idle Speed
- Ignition Timing
- Transmission Clutch Control
- Turbo Wastegate
- Starter Circuit/Idle Speed
- Engine Idle Speed (Low Battery Voltage)
- Idle Speed and Air/Fuel Mixture
- Transmission Gear Range
- Torque Converter Lockup

Now, these may seem like a lot of items that could go wrong, and a lot of items that could be made to appear to be malfunctioning when controlled by a defective computer. However, the point to remember is that the basics haven't changed.

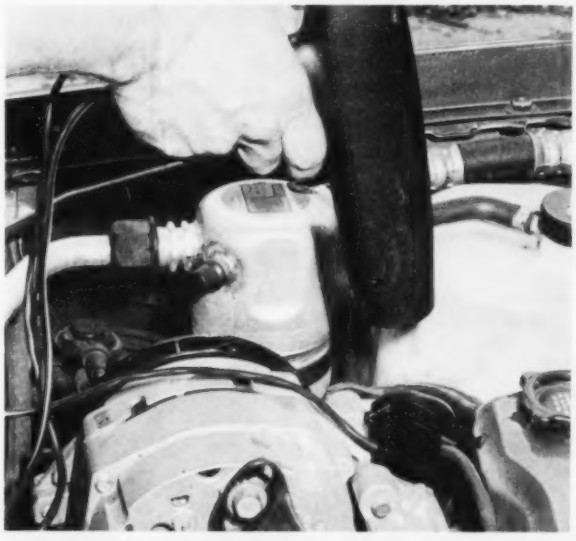
When servicing and troubleshooting an engine, don't blame the electronics and/or computer until you have checked all the items not monitored by the computer. Some of the items not monitored include:

- Engine Mechanical Condition
- Ignition System Condition
- Exhaust System Condition
- Basic Timing
- Hose and Tubing Routing

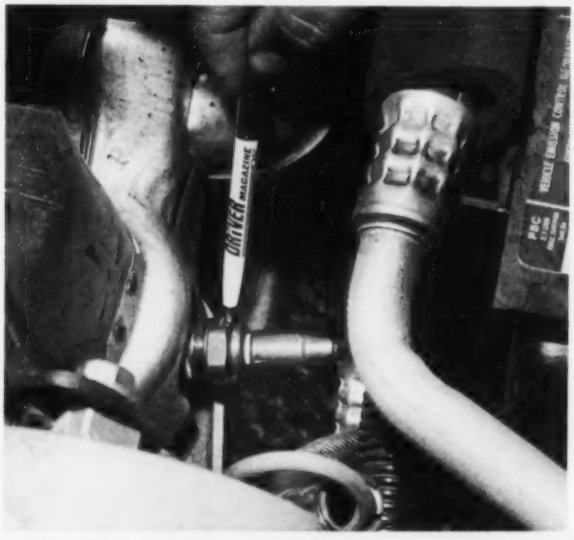
Establish the engine's condition with compression, vacuum and/or balance check before looking at the electronics.



The computer can adjust when a spark occurs, but it doesn't know how much spark to provide. Do a required KV test at idle and under load.



The engine's basic timing must be correct before the computer can make adjustments.



Check the exhaust system for restrictions before blaming the oxygen sensor for an over-rich fuel/air mixture.

Again, the basics haven't changed just because electronics and computers have been added. You should always start your diagnostics with the same basics you've always used.

First, you must establish the engine's basic condition. If it's not in good running order, of course it's not going to run good. The computer won't know if the engine has a bad valve or ring problems. It'll just know that some signal isn't right and try to correct for the problem.

Therefore, a compression test or engine balance check should be made before looking at the electronics. A vacuum gage can help you pinpoint where the trouble might be.

Always follow the recommended procedures (found in the shop manual and on the under-hood engine decal) and check the engine's basic timing. The smart box (computer) doesn't check this, yet all the timing advance and retard adjustments are made from this initial setting.

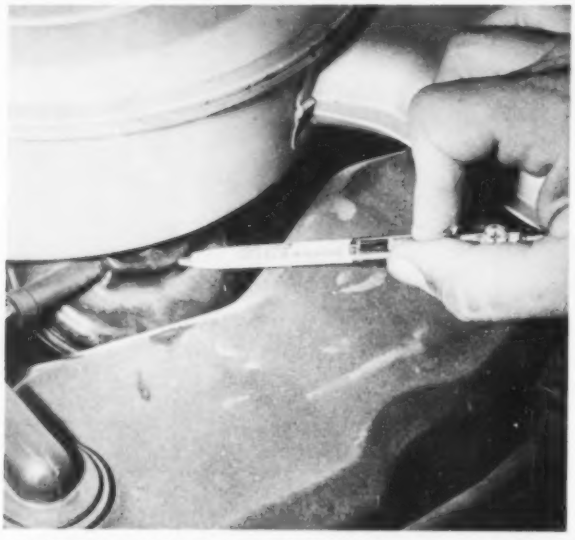
Next check the ignition system. While the brain box can adjust when the spark occurs, it does not know how much spark is required and whether the ignition system is capable of producing it. In addition, once the computer (or sensor trigger) has released a spark, it doesn't know whether the energy reaches the plug or not.

So be sure to check the required KV at idle and under load. Then check for short-circuits from the distributor cap and through damaged spark plug leads.

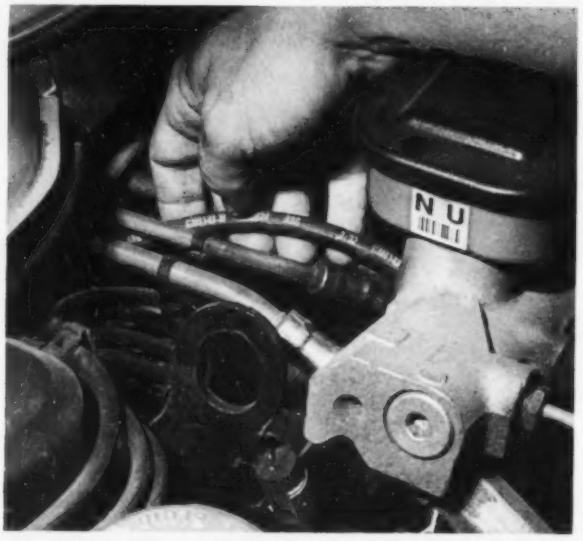
For an engine to run properly, it must breathe easily. Breathing includes exhaling, or in the case of an engine, exhaust.

continued

continued



The EGR cannot function properly if the exhaust system has been altered.



Check the routing and condition of the vacuum hoses and tubes before blaming the computer for an over-rich condition.

Be prepared to tell the service manager what happens when and where and how. He can't read your mind.

If the exhaust system is damaged or partially blocked, excessive back pressure will result.

Additionally, many late-model vehicles use a positive back pressure exhaust gas recirculation (EGR). If, for any reason, the exhaust system has been altered (bypass pipe(s) installed, converter beads removed, etc.) the back pressure will be below normal and the EGR will not function properly. Without proper EGR action, combustion chambers temperatures will be too high and engine operating parts will overheat. The end result will be damaged spark plugs, valves and pistons.

While the computer can control the air/fuel mixture, it doesn't check the condition of the exhaust system.

As was pointed out in last month's Backyard Mechanic, many poor driveability problems can be traced to damaged vacuum hoses and tubing as well as mis-routed lines. Rough idle, poor acceleration and low fuel economy can result from vacuum leaks. Because of the high under-hood temperatures and different fuels, hose inspection and maintenance are even more important today than ever before.

A vacuum line that has cracked, split or vibrated off its connection may cause the computer to sense that the air/fuel mixture is too lean. When it does, the computer will compensate for it by controlling fuel delivery into the intake manifold. Therefore be sure to look closely at the hose routing and condition.

Of course, there may be a problem that you aren't going to be able to solve yourself that still may involve replacing a $375.85 computer. In that case, you must be prepared to communicate with a service manager.

You've got to be able to tell him or her what happens: does it stumble, jerk or surge . . . You've got to be able to explain when it happens: when it's cold, hot, at start-up, under heavy acceleration, coasting . . . You should be able to tell him or her where it happens: in the driveway, on a hill, so many miles from starting out . . . And you should be able to explain how it happens: making a sharp turn, stopping suddenly, deceleration . . .

Computers may be difficult for the Backyard Mechanic to understand, but another computer can easily understand what ails another electronic system.

If at all possible you want the individual you're communicating with to road test the vehicle to verify the complaint. Driving habits may affect the malfunction, and the service manager's driving habits may not reveal the problem you've been experiencing.

For example, if you have a high-performance car, many people will insist on pushing it for all its worth, squealing the tires in four of the five gears. Then s/he will say, "there's nothing wrong with this car." Of course this is frustrating when you've been trying to explain that the problem occurs under light throttle between 2,750 and 3,200 rpm.

So, even though vehicles have onboard computers the basics haven't changed. You have to check the basics before replacing a good electronic component with another good (and expensive) unit.

Backfire LETTERS TO THE EDITORS

SEAT BELT TESTING

OK! OK! You've convinced me! I'll wear my seat belts. It has taken me about three months to really train myself to wear belts every time I get in the car.

Now I have question. I drive a car whose mechanical reliability is poor at best. How can I be sure that my seat belt and shoulder harness will work when I need them?

Can they be tested somehow, quickly and inexpensively?

Hope you can help me on this.

Elmer R. Leonhardt
Smyrna TN 37101

The way the seat belt does its job is fairly simple. The reel for the belt has a rachet that locks up in an emergency. One type is sensitive to movements of the car and the other is sensitive to movements of the belt itself. The former is the type used on most newer cars. If your car has a belt-sensitive system, sit in the seat and buckle the belt. Take hold of the shoulder belt and pull outward sharply. The belt will lock up within a couple of inches of your body, just as it would in an accident. If your car has car-sensitive belts, you need to test them with the car in motion. Find an empty section of road and drive along slowly. Five to 10 miles an hour is fast enough. Apply the brakes hard. The belt will lock up. Do this on a dry, level, paved road with no traffic.

Belts do deteriorate with age. If yours need replacing, be sure to get new ones rather than going to a wrecker lot. Belts are not an expensive item.

Congratulations on deciding to buckle up!

ONLY 20 SECONDS

The other day I was driving toward the base on a main highway. The morning rush hour traffic was moving along at 50 mph. It was 6:45 a.m. I could see a car still well behind me but coming up fast. Soon the driver zipped past me, going what seemed about 70 mph. A car in the passing lane ahead of him was also speeding, but not so fast. He quickly cut off another car that was in front of me and proceeded to buzz past the other speeding car. He continued these daring cut-ins, adjusting his speed from slow to fast in an attempt to gain distance and time. It was then 6:48 a.m.

I could see him in the right lane about 30 car lengths ahead of me, being forced into a box of vehicles to his left, front and rear. He finally reached an intersection and saw his chance to cut-off the vehicle on his left. He then accelerated once again into the passing lane and went straight through the intersection. Because many vehicles turned right, I was able to go straight through, too. I was now only seven cars behind him. It was 6:53 a.m.

I saw the man sitting on the couch in the customer service area. I walked over to the counter, took a number and sat down next to him. I was thinking to myself, "Was it all worth it? Risking the lives of others and yourself to arrive to an appointment only 20 seconds before someone who drove at a safe and courteous speed?" when my number was called. I heard a grunt of profanity from him. He had forgotten to get a number. It was 6:58 a.m.

TSgt. Stephen R. Perry, USAF
Clark AB, Philippines

MOTORCYCLE RIDERS RESPONSIBLE

The July article "In Favor of Motorcycles" and the BACKFIRE letter "Stop Passing the Blame" bothered me. I am not currently riding motorcycles but rode Yamaha 650's quite extensively from 1975 to 1981. I concur with both writers on most counts. As a car driver I do make a concerted effort to give the motorcyclist every courtesy. What concerns me is the attitude of many cyclists which is pointed out by MSgt. Petron in his first paragraph. "Sneaking down the shoulder, weaving through lines of cars, squeezing in and out of every little space, they (the bikers) leave the crowd behind."

This disregard of established lanes and proper road use is what often gets the cyclist into trouble. The shoulder, an established breakdown/emergency lane, is not an automatic extra lane for either cars or motorcycles. *Motorcyclists are subject to the same laws as all other motor vehicle operators.* Added maneuverability means more avenues of escape if an accident is imminent and, yes, easier location of parking. It does not mean that the dotted line dividing two lanes on a highway is a lawful motorcycle lane when traffic slows and it does not mean rapid high speed jumps from lane to lane to lane to lane. These two bad "driving habits" in particular place the blame on the motorcycle operator in that they are unsafe acts to begin with.

One other action by one cyclist I have noted on two separate occasions really galls me and makes motorcyclists look bad. When cars were lined up to pay an automatic toll on an off ramp, this cyclist passed the toll without paying, proceeded on down the shoulder of the ramp and veered right, passing through a "no right turn" red light. This type of disregard for the law is likely to make a car driver a little more aggressive toward all cyclists.

I would like to see an article which addresses state laws on the unauthorized use of the breakdown lanes and passing *through* stalled traffic. Some cyclist may be surprised some day when a trooper steps out from behind two waiting cars on a highway traffic jam and throws his hand up. You can bet that there would be a general round of applause from the motorists. That rider would deserve the ticket and subsequent penalty awarded in court.

The point I'm trying to make is that a motorcycle rider when licensed is deemed responsible to operate that motorcycle in a lawful manner. It doesn't make sense to take a known higher risk means of transportation and purposefully operate it in an unsafe manner.

Lt. Cmdr. N. Knutson, USCG
SIU Portsmouth VA 23703-2199

ANNOYED BY PICTURES

I do enjoy reading *Driver* Magazine. It has a lot of good articles and many valuable hints for good safety practices. However, I get annoyed when I see pictures such as the one that appeared on page 23 of the May 1985 issue.

I have had a lot of safety meetings in Civil Engineering (my guard unit) and at almost every one I have mentioned something about wearing rings, bracelets, etc., when working around any vehicle.

Please, in the future do not show pic-

Backfire

LETTERS TO THE EDITORS

tures like the one on page 23. This is especially true when working on batteries. It will make a permanent mark on you for the rest of your life to say the least.

MSgt. Francis E. Horky, ANG
Lincoln MAP (ANG) NE 68524-1897

We certainly agree about the dangers of wearing jewelry while working on your car, which was the point of printing the photo. The words under the picture say "don't wear jewelry when doing maintenance work." Even if everybody doesn't read the whole article, we believe skimmers who look at photos do read the captions.

DON'T PUSH YOUR LUCK

I would like to tell about an accident that may have saved two lives.

The day after Christmas two years ago, a friend and I were driving on a highway from one major city to a smaller city approximately 19 miles away. It was raining and snowing, yet the roads were not yet slick. It was about 12:30 p.m. I was driving south in the slow lane. Posted speed was 55 mph. I was going approximately 45 mph due to weather.

Almost home, I glanced in my rear view mirror and noticed one single head light coming up very fast behind me. I remembered thinking what an idiot the "motorcycle" rider was, driving at that speed in that type of weather. Glancing in the mirror again, I noticed that the light was no longer behind me, but getting very close to the left side of my car.

Neither my friend nor I anticipated what happened next. The "motorcycle" turned out to be a little 4x4 pick-up with a burnt out right headlight. Before anything could be done, the pick-up hit my left rear corner panel and started my car spinning across four lanes of traffic, coming to rest on a dirt embankment facing north.

Both my friend and I were thrown forward. Thank God for seat belts. If it weren't for them, my friend (if not both of us) may very well have gone through the windshield. Being only lap belts, they didn't prevent us from being thrown forward. My friend hit the dashboard and I the steering wheel. We both suffered concussions and had a few bruises and cuts; yet I'm sure our injuries were minor compared to what the result might have been without the seat belts.

The driver of the pick-up had no injuries, and the passenger cut his lip. Both vehicles were totaled.

The point is, don't push your luck. Don't wait until the weather gets bad to decide to buckle up. I was a "know it all" teenager who seldom if ever wore a seat belt. Not everyone makes that last minute decision to wear a device that take *seconds* to put on. It all points to the good when those last precious seconds may be YOUR LAST!

Amn. Sherisse D. Brandt, USAF
Holloman AFB NM 88330

ACCESSORIES NOT ADDED FOR PROTECTION

Having just read the September issue, I feel that I *must* comment on one letter expressed in the "Backfire" section.

In the letter entitled "Personal Safety Gear Not Enough," Peter T. Gallagher mentions a few things which need correcting.

First, accessories added to a motorcycle, such as fairings and backrests, are NOT added for safety reasons! A fairing is strictly something to part the weather, hold a radio, or to add to the cosmetic beauty of the motorcycle. A backrest or "sissy bar" can actually become a "spear" in the event of an accident as the bike flies through the air or slides along the ground!

Second, it sounds as if Mr. Gallagher is now ready for a Motorcycle Safety Foundation Better Biking Course. As an instructor for the MSF, I *know* that a properly executed countersteering maneuver would have saved Mr. Gallagher quite a bit of problem. Day or night, wet or dry, fast or slow, countersteering away from that manhole cover would have been as easy as putting on a helmet!

Personal safety gear (helmet, boots, leathers), unfortunately, is not always enough, but in most cases it helps a lot. However, accessories on a motorcycle are not added for protection in the case of a crash. The best protection for a rider is a properly educated rider!

SSgt. David H. Gorham, USAF
Altus AFB OK 73521

TIRE INFLATION

In your March 1985 issue you contained an excellent article on surviving the wet weather of spring. However, your discussion of hydroplaning contained a statement which could cause your readers trouble. Under the heading "Tire Inflation" was the statement "The less tread in contact with the road, the less control you have." Since there was no further explanation of that comment, one might be inclined to reduce tire pressure to get more rubber on the road. Actually, that makes a tire hydroplane easier. As I recall, the formula for clean, hydrodynamic hydroplaning speed is $S = 7/P$, where P is the tire pressure. So higher tire pressure will raise the speed at which a tire will hydroplane.

A couple other observations are in order. First, even the new higher-pressure radial tires will hydroplane well below 55 mph. Second, the equation is the best case. Oil on the pavement or other factors will decrease the hydroplaning speed below the level determined by the equation.

Similar factors apply to slushy snow — higher tire pressure will help the tire to cut through slush to the pavement below. Lower pressure will help the tire's flotation, to keep from sinking into snow. Since slush is a more prevalent problem in many places, the conventional wisdom of reducing tire pressure in snow may hurt more than it helps.

Cmdr. Karl Koenig, USNR
Albuquerque NM 87112

It will definitely hurt. As we said in October's winter driving article, "Not only will it make handling the car more difficult, it'll also make your tires wear out faster. It will not give you any more traction."

Address your letters to:

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AFISC/SEDD
Norton AFB CA 92409

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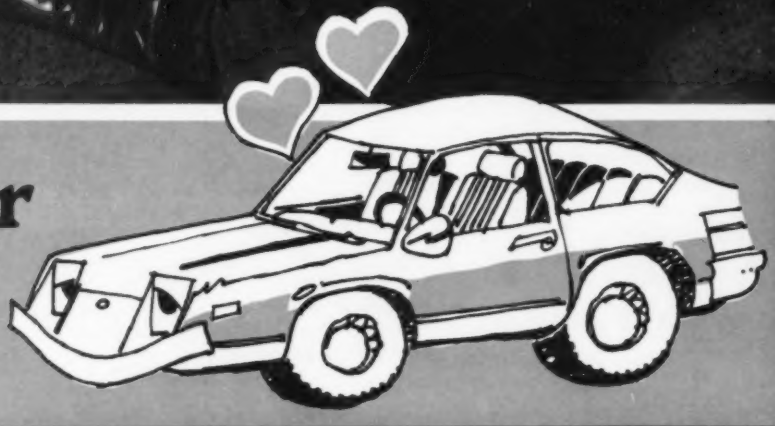
Curled Up With A Good Book Lately?

A SAFE CAR IS PROPERLY MAINTAINED



Follow Your Owner's Manual